

CERTIFICATE

Engineering Evaluation Certificate

No.6405 I02R00

ISSUED 02 May 2019

ResCom Magnesium Oxide Board

This engineering certificate serves as a certificate from a professional fire engineer in accordance with Clause A5.2 (1)(e) of the National Construction Code Volume One Building Code of Australia 2019

Ignis Solutions reserves the right to amend or withdraw this assessment if information becomes available which indicates the stated fire performance may not be achieved

PRESENTED TO

Magnesium Oxide Board Corporation Pty Ltd
8 Piper Street Caboolture
Queensland Australia 4510
www.rescombp.com.au
admin@rescombp.com.au
+61 7 5432 9890

ENGINEERING BODY

Ignis Solutions Pty Ltd
ABN 24 160 047 125
PO Box 5174
Braddon ACT 2612
mail@ignissolutions.com.au



Product Description

- The ResCom board is a Composite cold form ceramic magnesia base lining Board for building walls and other construction areas where a non-combustible material or a Fire Resistance Level is required,
- The ResCom board satisfies the Building Code of Australia requirements for non-combustibility, fire hazard properties and select Fire Resistance Levels under set wall and floor designs. Where an FRL is required for the Ceiling, Wall or Floor, the equivalent FRL design or better must be replicated to the tested system.
- Product Name: ResCom Board.
- Product Size: 4mm to 50mm in thickness, 1220mm x 2440mm, 2745mm and 3050mm

Scope of Use

- The ResCom Board is permitted to be used as an element of building ceiling, walls or floor in accordance with manufacturers instructions for buildings of Type A, B or C construction, Class 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 Occupancies and of any height or rise in storeys.
- The ResCom Board is suitable to be penetrated as per BCA Clause C3.15 by a tested system, be provided as an additional fire protective covering to existing wall systems.
- The ResCom Board is to be installed in accordance with the ResCom Technical Installation Manual Edition 6.
- Fixing of the board is to be via Non-corrosive 304 minimum stainless steel or galvanised hex head screws of 10-12 gauge at 300mm centres and 450mm centrally within the board no greater than 50mm from the edge.
- The ResCom board has been tested, evaluated and is suitable to be used based on testing for:
 - Single direction boundary walls to -/90/90
 - Dual direction walls up to -/240/240
 - Protection of steel columns
 - Intertenancy separation walls

National Construction Code – Volume One 2019

- Clause A2.0 (1) complying with the Governing Requirements of the NCC
- Schedule 3 Definitions – Non-combustible – Tested to AS 1530.1
- Clause A5.2 sub-clause (1)(e) as evidence to support that the ResCom Board meets the nominated Performance Requirements under an Engineering Certificate.
- Deemed-to-Satisfy Schedule 5 – Fire-Resistance of Building Elements – Where the wall system A, B, C and D is applied.
- Deemed-to-Satisfy Clause C1.1 and Specification C1.1 Type of Construction – where FRL's of up to -/60/90 and -/240/240 as established in accordance with Schedule 5.
- Clause G5.2 Construction in Bushfire Prone Areas – where an FRL of -/30/30 satisfies use in Bushfire Prone Areas requiring BAL 12.5 to Flame Zone (FZ).
- Deemed-to-Satisfy Clause C1.10 (a)(ii), (c)(xv) and Specification C1.10 Clause 4 Fire Hazard Properties AS/NZS 3837:1998, Group 1, Average Specific Extinction Area 24.7 (m²/kg)

National Construction Code – Volume Two 2019

- Clause A2.0 (1) complying with the Governing Requirements of the NCC.
- Clause 5.2 sub-clause (1)(e) as evidence to support that the ResCom Board meets the nominated Performance Requirements under an Engineering Certificate.
- Part 3.7.2 Fire Separation and Part 3.10.5 Bushfire Areas – The 6mm ResCom Board in the tested wall systems achieves an FRL of at least -/60/60 and can be used as the exterior wall or separating wall between Class 1 and/or 10 buildings within 900mm of a boundary or Bushfire Areas of BAL 12.5 to FZ.

Benjamin Hughes-Brown

FIEAust, CPEng, NER, APEC Engineer, IntPE (Aust)

Chartered Professional Engineer, FPAA Professional Engineer
CPEng, NER (Fire, Mech) 2590091, RPEQ11498, BPE-C10-1875, EF-39394,
MFSafety (CIT), BEng (UTS), GradDipBushFire (UWS), DipEngPrac (UTS), DipEng (CIT)



CONFIDENTIAL

IGNIS COMPLIANCE SCHEDULE

A. Introduction

The purpose of this assessment is to evaluate a performance solution of the ResCom Board to satisfy the performance requirements of the National Construction Code Volume 1 and 2 – Building Code of Australia 2019 (BCA).

This assessment evaluates the product as a non-combustible fire resistant board within a wall system achieving various Fire Resistance Levels as well as Acoustics. The various wall systems are detailed below.

- A. The result for compliance under the BCA for a wall of -/90/60 require the following construction:
10mm thick ResCom Board on either side of a 75mm lightgauge steel joist and 50kg/m³ mineral wool insulation.
- B. The result for compliance under the BCA for a wall of -/120/120 require the following construction:
12mm thick ResCom Board on either side of a 46mm galvanised steel joist at nominally 610mm centres and 94kg/m³ Luyangwool 72 mullite crystal fibre blanket insulation
- C. The result for compliance under the BCA for a wall of -/180/90 require the following construction:
12mm thick ResCom Board on either side of a 75mm steel studs at nominally 600mm centres and 180kg/m³ Rockwool insulation.
- D. The result for compliance under the BCA for a wall of 90/90/60 which includes an PUR core require the following construction:
12mm thick ResCom Board bonded on either side to a closed cell polyurethane foam core.
- E. The result for compliance under the BCA for a wall of -/240/240 requires the following construction:
15mm thick ResCom Board bonded on either side of 150mm 18 gauge steel studs at 600mm centres with 2.7kg mineral wool insulation.
- F. The result for compliance under the BCA for a wall to achieve an Rw(C,C_r) of 47 (-3,-9) dB require the following construction:
12mm thick ResCom Board on either side of a 75mm steel studs with nominally 600mm centres and 24kg/m³ glasswool R2.0 insulation.
- G. The result for compliance under the BCA for a wall to achieve an Rw(C,C_r) of 60 (-3,-9) dB require the following construction:
12mm thick ResCom Board on either side of a 75mm steel studs on nominally 600mm centres filled with 24kg/m³ glasswool R2.0 insulation, a 20mm air gap and additional 75mm steel studs on nominally 600mm centres filled with 24kg/m³ glasswool R2.0 insulation
- H. The result for compliance under the BCA for a wall to achieve an Rw(C,C_r) of 62 (-3,-9) dB require the following construction:
12mm thick ResCom Board on the side of a 75mm steel studs on nominally 600mm centres filled with 24kg/m³ glasswool R2.0 insulation, a 25mm air gap and additional 200mm steel studs on nominally 450mm centres filled with 24kg/m³ glasswool R2.0 insulation and 18mm ResCom Board.
- I. The result for compliance under the BCA for a wall to achieve an Rw(C,C_r) of 64 (-3,-9) dB require the following construction:
12mm thick ResCom Board on the side of a 75mm steel studs on nominally 600mm centres filled with 24kg/m³ glasswool R2.0 insulation, a 25mm air gap and additional 200mm steel studs on nominally 600mm centres filled with 24kg/m³ glasswool R2.0 insulation and 2 layers of 12mm ResCom Board.

The above systems can be used in a wall or floor situation provided the above tested system or better is installed.

B. Technical Specification

Product

The ResCom Board is a composite cold form ceramic magnesia base lining for use within building walls and other construction areas where a Fire Resistance Level is required.

The ResCom Board can be fixed within and external wall system.

The ResCom Board can be penetrated by materials and building services without the requirement for additional protection measures. This does not apply to any fire resisting element of the wall or building on which the board is attached to. These elements will require compliant penetration protection in accordance with Clause C3.15 of the BCA.

Product Identification

The ResCom Board can be identified by the ResCom stamp on each board.

Panel Fixing and Installation

The ResCom Board can be mechanically fixed directly to the wall structure be it a timber, steel, concrete/masonry wall structure or be connected via a top hat to the sub-frame to create a fire resistant wall or to enhance the Fire Resistance Level of an existing wall. The stud or fixing is to be a maximum of 600mm (typically 450mm) depending on structural design. Non-corrosive 304 minimum stainless steel screws of 10-12 gauge at 300mm centres on the edge and 450mm centres centrally within the board at no greater than 50mm from the edge. The Installation is to be in accordance with the MgO Corp Board Fire and Acoustic Walls, Ceiling and Floors Installation Manual (FIM-Edition ~~6-2017~~).

C. Relevant Technical Literature

The National Construction Code

The National Construction Code (NCC) is an initiative of the Council of Australian Governments developed to incorporate all on-site construction requirements into a single code. The Building Code of Australia (BCA) is Volume One and Volume Two of the NCC.

The BCA is produced and maintained by the Australian Building Codes Board (ABCB) on behalf of the Australian Government and each State and Territory government.

The BCA is a uniform set of technical provisions for the design and construction of buildings and other structures throughout Australia whilst allowing for variations in climate and geological or geographic conditions.

BS 476-4:1970 Fire test on building materials and structures – non-combustibility.

This British Standard specifies a method of test for determining whether building materials are non-combustible within the meaning of the definition. Materials used in the construction and finishing of buildings or structures are classified 'non-combustible' or 'combustible' according to their behaviour in the 'non-combustible' test. This test is intended for building materials, whether coated or not, but it is not intended to apply to the coating alone.

The primary difference between the BS 476-4 and AS 1530.1 is that AS 1530.1 sets the sample to be a 45mm diameter disc whilst BS 476-4 sets a width and breadth of 40mm.

The test deemed non-combustibility if, during the test, non of the three specimens either:

1. Causes the temperature reading from either of the two thermocouples to rise by 50°C or more above the initial furnace temperature; or
2. Is observed to flame continuously for 10s or more inside the furnace.

Within AS1530.1, the criteria to deem a material to be combustible occurs when:

1. The mean duration of sustained flaming is other than 0 for the mean for the summation of all the individual durations of flaming for 5s or longer and divided by 5.
2. The mean furnace thermocouple temperature rise exceeds 50°C
3. The mean specimen surface thermocouple temperature rise exceeds 50°C.

AS 1530.4 – Fire-resistance tests on elements of construction – Methods for determination of the fire resistance of loadbearing elements of construction.

Each test is a full scale fire-resistance tests of elements of building construction following the standard fire curve. In most cases, a single test, carried out in accordance with either of these standards, establishes the fire-resistance for the element of construction concerned. The test subjects the material to a furnace where it is heated to the standard time/temperature rise curve. The size of the tested element under the standard test is to be 3m.

The BCA sets the principle requirements for fire hazard properties of building materials within Schedule 5 for where building elements are to achieve a Fire Resistance Level. Clause A5.4 requires compliance in accordance with Schedule 5.

Schedule 5 – Fire Resistance of Building Elements sets the scope for determining the fire resistance of building elements to be tested to standard fire test. The term standard fire test is defined within the BCA as the Fire-resistance Tests of Elements of Building Construction as described in AS 1530.4. AS 1530.4 describes one of test elements for the building element is to be subjected to a furnace where the temperature curve follows the standard fire curve.

The standard fire curve is detailed in figure 2.3 of AS 1530.4 and provided below. The standard time-temperature curve is widely accepted and used by most of the standards and testing agencies. It is based on the maximum induction of the severity of a fire completely burning out an ordinary brick, wood-joisted building loaded with combustible contents. The use of this curve, together with information on the fire loading, is used to estimate the severity of a fire.

FIGURE 1:

STANDARD FIRE CURVE AS1530.4

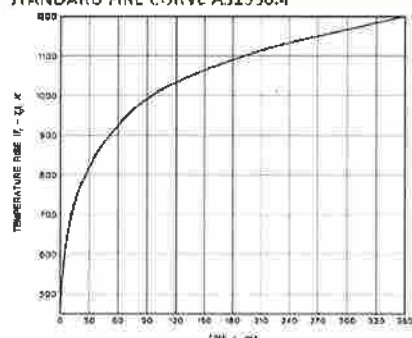


FIGURE 2.3 (STANDARD TIME-TEMPERATURE RISE CURVE)

AS/NZS 3837:1998 – Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter.

This Standard specifies a test method for measuring the response of materials exposed to controlled levels of radiant heating with or without an external igniter. The test method is used to determine the ignitability, heat release rates, mass loss rates, effective heat of combustion, and smoke release of materials and products.

The cone calorimeter is a small-scale oxygen consumption calorimeter. Specimens, 100 mm square are supported horizontally on a load cell and exposed to a set external radiant heat flux in ambient air conditions. The radiant heat source is a conically shaped radiator that can be set to impose any heat flux in the range 0-100 kW/m² on the specimen surface. Ignition is promoted using a spark igniter. Combustion gases are extracted in an exhaust duct where instrumentation measures exhaust gas flow, temperature, O₂, CO and CO₂ concentrations and smoke optical density. From these measurements quantities such as heat release rate, mass loss rate, effective heat of combustion and smoke production can be calculated. Time to ignition at set heat flux exposures is determined by observation. The cone calorimeter apparatus and procedure are described in ISO 5660, AS/NZS 3837 and ASTM E 1354.

D. ResCom MgO Product Fire Testing

The ResCom Board has been tested to local and equivalent fire standard. This includes:

1. BS 476-4:1970 Fire test on building materials and structures – non-

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combustibility

2. AS 1530.4:2005 Fire-resistance tests on elements of construction – Methods for determination of the fire resistance of loadbearing elements of construction.
3. AS 3837:1998 Method of test for heat and smoke release rates

BS 476-4:1970 Fire test on building materials and structures – non-combustibility.

Combustibility tests are essentially used to determine if materials are combustible or non-combustible. Various standard test methods exist around the world including (ISO 1182, BS 476 part 4, ASTM E136, ASTM E2652, AS 1530.1) however they are all fairly similar.

Small specimens are exposed to high temperatures of typically 750 °C or 835 °C within a small conical tube furnace. Criteria for non-combustibility are typically:

- No sustained flaming (typically > 5 s)
- Mean furnace temperature rise must not typically exceed 50 °C
- Mean specimen surface temperature must not typically exceed 50 °C
- Criteria for limited specimen mass loss may also be applied.

Many building codes around the world deem materials such as gypsum plaster to be non-combustible as they don't necessarily meet the above test criteria for items such as mass loss.

External wall assemblies constructed entirely of non-combustible materials do not generally pose any hazard relating to fire spread.

The ResCom Board was tested by Intertek within their Shanghai test facility and documented in their test report 160204003SHF-BP-4 dated 18 March 2016.

The following test results were recorded.

Description	Specimen 1	Specimen 2	Specimen 3	Requirements
Time of continuous flaming (s)	0	0	0	<10
Temperature rise of furnace (°C)	2	3	1	<50
Temperature rise of sample (°C)	0	0	0	<50
Classification	Non-combustible	Non-combustible	Non-combustible	-

Based on the test results when subjected to the criteria under both BS 476-4 and AS 1530.1 the product is deemed non-combustible.

The BCA sets the criteria for non-combustibility through Clause A1.1 definitions. Specification C1.1 Clause 3.1(b) and 4.1(b) requires external and common walls to be non-combustible. The ResCom Board can be used in these situations.

AS/NZS 3837:1998 Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter.

SGS tested the ResCom Board to a rate of 50 kW/m² in their test report SHCCM150902768 dated 18 September 2015 to AS/NZS 3837:1998.

The test produced the following results:

Regulatory indices:	
Group Number	1
Average specific extinction area	24.7kW/m ²

AS 5637.1 details group numbers as follows:

1. A Group 1 material is one that does not reach flashover when exposed to 100kW for 600 seconds followed by exposure to 300kW for 600 seconds.
2. A Group 2 material is one that reaches flashover following exposure to 300kW within 600 seconds after not reaching flashover when exposed to 100kW for 600 seconds.
3. A Group 3 materials is one that reaches flashover in more than 120 seconds but with a 600 seconds when exposed 100kW.
4. A Group 4 material is one that reaches flashover within 120 seconds when exposed to 100kW.

The test results demonstrate a group 1 is achieved, meaning the material does not reach flashover.

AS 1530.4-2005 Fire-resistance tests on elements of construction – Methods for determination of the fire resistance of loadbearing elements of construction.

Australian Standard AS 1530.4:2005 sets out test procedures and criteria for the determination of fire-resistance of elements of building construction via a large scale (3m x 3m) furnace test. AS1530.4 sets results in relation to Structural

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adequacy, integrity and insulation.

SGS is an international testing service. Their Shanghai test facility completed testing on the ResCom Board within a wall installation.

The test was undertaken on 03 June 2015 in report SHCCM150401181 with the wall set up being **10mm thick ResCom Board on either side of a 75mm light gage steel joist and 50kg/m³ mineral wool insulation**. The following results were produced:

Regulatory Indices:	
Structural adequacy	-
Integrity	90 minutes
Insulation	67 minutes

The result for compliance under the BCA are limited to **-/90/60**.

Testing undertaken by Research Engineering Development Façade Consultants Limited to BS 476 part 22 where the equivalent standard fire curve was used in the boards evaluation.

The test was undertaken on 18 May 2007 in report R07A15A with the wall set up being **12mm thick ResCom Board on either side of a 46mm galvanised steel joist at nominally 610mm centres and 94kg/m³ Luyangwool 72 mullite crystal fibre blanket insulation**. The following results were produced:

Regulatory Indices:	
Structural adequacy	-
Integrity	150 minutes
Insulation	132 minutes

The result for compliance under the BCA are limited to **-/120/120**.

Testing undertaken by Intertek Shanghai testing facility to ASTM E119-16a where the equivalent standard fire curve was used in the boards evaluation.

The test was undertaken on 19 December 2016 in report 160929005SHF-BP-1 with the wall set up being **12mm thick ResCom Board on either side of a 75mm steel studs at nominally 600mm centres and 180kg/m³ Rockwool insulation**. The following results were produced:

Regulatory Indices:	
Structural adequacy	-
Integrity	180 minutes
Insulation	90 minutes

The result for compliance under the BCA are limited to **-/180/90**.

Testing undertaken by Exova Warrington to BS 476 part 21 where the equivalent standard fire curve was used in the boards evaluation.

The test was undertaken on 28 September 2016 in report 372077 with the wall set up being **12mm thick ResCom Board bonded on either side to a closed cell polyurethane foam core**. The following results were produced:

Regulatory Indices:	
Structural adequacy	90 minutes
Integrity	90 minutes
Insulation	60 minutes

The result for compliance under the BCA are limited to **90/90/60**.

Testing undertaken by VTEC Laboratories Inc. testing facility to ASTM E119 where the equivalent standard fire curve was used in the boards evaluation.

The test was undertaken on 9 November 2005 in report VTEC#100-2295-2 with the wall set up being **15mm thick ResCom Board on either side of a 150mm 18 gauge steel studs at nominally 600mm centres and 2.5kg mineral wool insulation**. The following results were produced:

Regulatory Indices:	
Structural adequacy	-
Integrity	240 minutes
Insulation	240 minutes

The result for compliance under the BCA are limited to **-/240/240**.

The ResCom Board has been evaluated by the Exova Warrington Victorian team in their report 24158-00 dated 14/01/10. The Exova Warrington report reviewed and validated the above tests in the wall achieving an FRL of **-/60/60 minutes** for

the 10mm board and **-/120/120 minutes** for the 12mm board when installed to the minimum wall design. Exova Warrington confirmed the relevance of the tests and equivalence to AS 1530.4. This Ignis Solutions evaluation extends the Exova Warrington report, considering the two relevant fire tests in accordance with the Building Code of Australia 2016.

The ResCom Board has been evaluated by the CSIRO North Ryde team in their report FCO-2830/3940 dated 27 October 2010. The CSIRO report reviewed and validated the above tests in the wall achieving an FRL of **-/60/60 minutes** for the 10mm board and **-/120/120 minutes** for the 12mm board when installed to the minimum wall design. The CSIRO confirmed the relevance of the tests and equivalence to AS 1530.4. This Ignis Solutions evaluation extends the CSIRO report, considering the two relevant fire tests in accordance with the Building Code of Australia 2016.

E. Incipient Spread of Fire

Introduction

The compliance of the ResCom Board to the incipient spread of fire has been reviewed inline with the SGS AS 1530.4 testing as per the requirements of the BCA as well as that established by AS 1530.4:2014.

A number of documents were reviewed within this engineering certificate. This includes:

- The National Construction Code – Volume One – Building Code of Australia 2016
- Standards Australia AS 1530.4:2014 Methods for fire tests on building materials, components and structures Part 4: Fire-resistance tests of elements of building construction
- SGS test report SHCCM150401181 dated 03 June 2015.

SGS has undertaken testing of the 10mm product in accordance with AS 1530.4 in their report SHCCM150401181. The specimen was installed into a prepared masonry wall with the opening size 3010mm width by 3010mm height. C75 light gage steel joists were fixed to masonry wall by expansion bolts. The exposed and unexposed face testing panels were fixed to C75 light gage steel joists by self-tapping screw (spaced about 10mm). Gaps between the sample panels as well as gaps around the specimen and masonry wall were covered by a fire resistance boiting and glue. The specimen had a single layer of 10mm ResCom board on either side of the C75 light gage steel joists with mineral wool (50kg/m³) within the wall cavity.

In accordance with Clause A1.1 of the BCA, SGS is considered a Registered Testing Authority based on its International Laboratory Accreditation Cooperation Mutual Recognition Agreement recognised by the National Association of Testing Authorities (NATA).

Documentation of Decision Making

The National Construction Code (NCC) is an initiative of the Council of Australian Governments developed to incorporate all on-site construction requirements into a single code. The Building Code of Australia (BCA) is Volume One and Volume Two of the NCC.

The BCA is produced and maintained by the Australian Building Codes Board (ABCB) on behalf of the Australian Government and each State and Territory government.

The BCA is a uniform set of technical provisions for the design and construction of buildings and other structures throughout Australia whilst allowing for variations in climate and geological or geographic conditions.

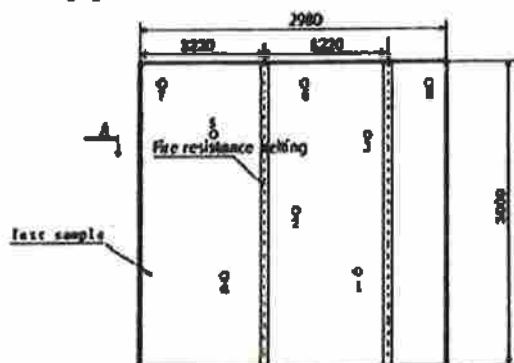
Clause A2.5 details the requirements for Resistance to the Incipient spread of fire. A ceiling is deemed to have the resistance to the incipient spread of fire to the space above itself if-

- It is identical with a prototype that has been submitted to the Standard Fire Test and the resistance to the incipient spread of fire achieved by the prototype is confirmed in a report from a Registered Testing Authority which-
 - describes the method and conditions of the test and form of construction of the tested prototype in full; and
 - certifies that the application of restraint to the prototype complies with the Standard Fire Test.

Clause A1.1 provides a definition for the Resistance to the incipient spread of fire, in relation to a ceiling membrane, means the ability of the membrane to insulate the space between the ceiling and roof, or ceiling and floor above, so as to limit the temperature rise of materials in this space to a level which will not permit the rapid and general spread of fire throughout the space.

The BCA sets the requirement in a number of provisions for a ceiling to have a resistance to the incipient spread of fire.

AS 1530.4 provides details of establishing the incipient spread of fire through testing. An array of thermocouples were provided on the unexposed side of the panel in accordance with Clause 4.3.3(b) of AS 1530.4 and detailed in the following figure.

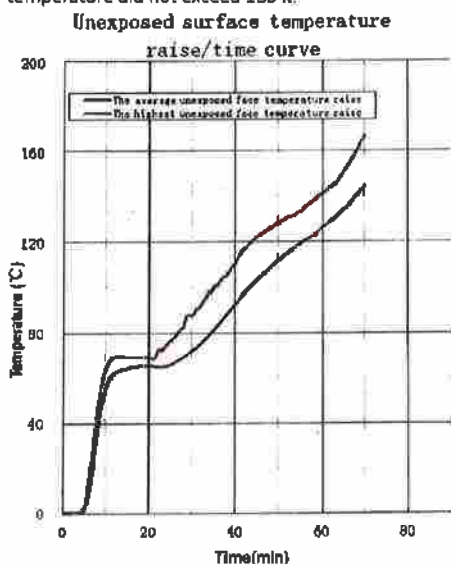


Clause 4.7.4 of AS 1530.4 details the criteria of failure for the incipient spread of fire being deemed to have occurred when the average temperature of the five thermocouples at any one of the locations has risen by more than 180K above the initial temperature.

Clause 4.8 of AS 1530.4 details the results shall be stated in terms of the time in whole minutes from the start of the test until failure has occurred under incipient spread of fire. It is noted that the incipient spread of fire is not taken into account in the determination of fire-resistance.

The ResCom 10mm board when tested achieved an FRL of -/60/90 minutes.

The temperature raise/time curve is detailed below. The temperature was measured for 65 minutes consecutively before being terminated. The rise in temperature did not exceed 180 K.



Conclusion

It is considered in the opinion of the author of this note that based on the testing undertaken by SGS and documented in their test report SHCCM150401181 that the ResCom board achieves a resistance to the incipient spread of fire of 70 minutes.

F. Penetrations

Introduction

Penetrations in a building element (being a floor, wall, ceiling or the like) is to comply with the requirements of Clause C3.15 of the BCA.

Clause C3.15 of the BCA permits three methods of compliance:

1. Tested Systems; or
2. Ventilation and air-conditioning; or
3. Compliance with Specification C3.15.

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ResCom recommends penetrations comply with the requirements of BCA Specification C3.15.

Clause C3.15 of the BCA sets requirements for select penetration scenarios. These include:

- A. Metal Pipes,
- B. Sanitary plumbing (metal or UPVC),
- C. Wire or cables (individual or cluster),
- D. Electrical switch, outlet or the like.

The requirements under Clause C3.15 and Specification C3.15 of the BCA for each of the penetration scenarios is detailed below.

Metal Pipes

The metal pipe is permitted to penetrate the ResCom board provided;

- i. It does not contain a flammable or combustible liquid or gas; and
- ii. Comprised entirely of metal (excluding pipe seals or the like); and
- iii. If not normally filled with liquid the penetration through the ResCom MgO board must not be located within 100mm of any combustible building elements or where combustible elements may be located adjacent to the penetration. This includes any timber studs or beams supporting the ResCom MgO Board; and
- iv. The opening must be neatly formed, cut or drilled; and
- v. Be no closer than 200mm to any other service penetration; and
- vi. Accommodate only one pipe within the single penetration; and
- vii. The gap between the pipe and floor must be fire-stopped as follows:
 - a. Any lagging or thermal insulation through the penetration must be fire-stopping material of concrete, high-temperature mineral fibre, high-temperature ceramic fibre or other material that does not flow at a temperature below 1120°C when tested in accordance with ISO 540;
 - b. Any fire stopping material used must have been tested in accordance with AS 1530.4 and demonstrate to not impair the fire-resisting performance of the building element or fire-resisting performance of the test slab;
 - c. If the penetration of the metal pipe is through a hollow wall or floor/ceiling system, the cavity must be framed and packed with fire-stopping material that is packed into the gap between the metal pipe to a thickness of 25mm all round the service for the full length of the penetration and compressed to the same degree as tested in accordance with AS 1530.4.

Sanitary plumbing (metal or UPVC)

- i. Is of metal or UPVC pipe; and
- ii. Where it penetrates floors be of a Class 5, 6, 7, 8 or 9b building only; and
- iii. If in a sanitary compartment separated from other parts of the building by walls with an FRL required by BCA Spec C1.1 for a stair shaft in the building and a self closing -/60/30 fire door; and
- iv. The opening be neatly formed and no large than is necessary to accommodate the pipe or fitting; and
- v. The gap between the pipe and floor must be fire-stopped as follows:
 - a. Any lagging or thermal insulation through the penetration must be fire-stopping material of concrete, high-temperature mineral fibre, high-temperature ceramic fibre or other material that does not flow at a temperature below 1120°C when tested in accordance with ISO 540;
 - b. Any fire stopping material used must have been tested in accordance with AS 1530.4 and demonstrate to not impair the fire-resisting performance of the building element or fire-resisting performance of the test slab;
 - c. If the penetration of the pipe is through a hollow wall or floor/ceiling system, the cavity must be framed and packed with fire-stopping material that is packed into the gap between the pipe to a thickness of 25mm all round the service for the full length of the penetration and compressed to the same degree as tested in accordance with AS 1530.4.

Wire or cables (individual or cluster)

- i. The opening must be neatly formed, cut or drilled and no closer than 50mm to any other service; and
- ii. The opening must be no larger in cross-sectional area than
 - a. 2,000mm² if only a single cable is accommodated and the gap between the cable and wall, floor or ceiling is no wider than 15mm; or
 - b. 500mm² in any other case; and
- iii. The gap between the service and the ResCom MgO board must be fire-stopped as follows:
 - a. Any lagging or thermal insulation through the penetration must be fire-stopping material of concrete, high-temperature mineral fibre, high-temperature ceramic fibre or other material that does not flow at a temperature below 1120°C when tested in accordance with ISO 540.
 - b. Any fire stopping material used must have been tested in accordance with AS 1530.4 and demonstrate to not impair the fire-resisting performance of the building element or fire-resisting performance of the test slab.
 - c. If the penetration of the wires or cables is through a hollow wall or floor/ceiling system, the cavity must be framed and packed with fire-stopping material that is packed into the gap between the pipe to a thickness of 25mm all round the service for the full length of the penetration and compressed to the same degree as tested in accordance with AS 1530.4.

Electrical switch, outlet or the like.

- i. If an electrical switch, outlet, socket or the like is accommodated in an opening or recess in a wall, floor or ceiling of ResCom MgO board, the opening or recess must not:
 - a. Be located opposite any point within 300mm horizontally or 600mm vertically of any opening or recess on the opposite side of the wall; or
 - b. Extend beyond half the thickness of the wall; and
- ii. The gap between the service and the ResCom MgO wall, floor or ceiling must be fire-stopped as follows:
 - a. Any lagging or thermal insulation through the penetration must be fire-stopping material of concrete, high-temperature mineral fibre, high-temperature ceramic fibre or other material that does not flow at a temperature below 1120°C when tested in accordance with ISO 540.
 - b. Any fire stopping material used must have been tested in accordance with AS 1530.4 and demonstrate to not impair the fire-resisting performance of the building element or fire-resisting performance of the test slab.
 - c. If the penetration is through a hollow wall or floor/ceiling system, the cavity must be framed and packed with fire-stopping material that is packed into the gap between the pipe to a thickness of 25mm all round the service for the full length of the penetration and compressed to the same degree as tested in accordance with AS 1530.4.

Conclusion

Penetrations of the materials detailed above, through the ResCom Board will comply with the BCA through Performance Requirement CP6, Clause C3.15 and Specification C3.15 if installed as detailed below.

G. Slab Infill

Should a floor slab which achieves a Fire Resistance Level (FRL) require infill to maintain its FRL, the ResCom board can be applied in an equivalent manner as the wall systems A, B, C and D as detailed in the introduction above. The framing and insulation of the system is to be at a minimum equivalent to that of the tested system. The slab infill system design is to be reviewed, approved and if necessary enhanced at the requirement of structural adequacy.

H. Fire Protective Covering

The ResCom board can be applied to an existing wall system that achieves a Fire Resistance Level. Should the application of the fire protective covering be equivalent to that of the tested system, the enhancement is considered to be equivalent to the wall systems A, B, C and D where the resultant FRL would be cumulative.

I. Reference Documents

- National Construction Code – 2019 – Volume One – Building Code of Australia Class 2 to 9 Buildings.
- Guide to the Building Code of Australia 2019– Volume One, Class 2 to Class 9 Buildings’, Australian Building Codes Board, 2019 (the Guide).
- British Standards BS 476-4:1970 Fire test on building materials and structures – non-combustibility
- Standards Australia, AS 1530.4-2005 Fire-resistance tests on elements of construction – Methods for determination of the fire resistance of loadbearing elements of construction, 2005, Sydney.
- Standards Australia, AS/NZS 3837:1998 Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter, 1998, Sydney
- SGS SHCCM150401181 test to AS1530.4 dated 3 June 2015.
- Research Engineering Development Façade Consultants Limited R07A15A to BS 476 part 22 dated 18 May 2007.
- Exova Warrington Victorian report 24158-00 dated 14/01/10
- CSIRO North Ryde report FCO-2830/3940 dated 27 October 2010.
- Intertek report 1609290055HF-BP-1 dated 23 December 2016.
- Exova Warringtonfire 372077 dated 16 December 2016, United Kingdom
- Ignis Solutions ResCom – MgO Board penetration evaluation 4099.3 I01 R00 dated 18 August 2016.
- Ignis Solutions ResCom – Professional Engineering Certificate 4099.1 I01R00 dated 11 July 2016.

J. Conclusion

In the opinion of Ignis Solutions, the ResCom Board is fit for purpose and will comply with the National Construction Code Volume One and Two – Building Code of Australia 2019 to the extent specified in this Evaluation Report provided it is used, designed, installed and maintained as set out in this Evaluation Report.

The Evaluation Report is issued only to MgO Corp and is valid until expiry, subject to the Conditions of Evaluation Report.

K. Conditions and Limitations

This certificate is limited to the details within this document including the above compliance elements, product description and scope. This report is to be read, considered and used as a whole document.

Fixing of the board is to be via Non-corrosive 304 minimum stainless steel or galvanised hex head screws of 10-12 gauge at 300mm centres and 450mm centrally within the board no greater than 50mm from the edge.

The ResCom Board is to be installed in accordance with the ResCom Technical Installation Manual Edition 6.

This Evaluation Report:

1. relates only to the product as described herein;
 2. must be read, considered and used in full together with the technical literature;
 3. does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 4. is copyright of Ignis Solutions Pty Ltd.
- Ignis Solutions Pty Ltd makes no representation or warranty as to:
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